2008-03-12

Training Wing Five FY 2008 Primary Pilot Production

Orlowski, Chris; Chrapkiewicz, Pete; Loverink, Matt

Monterey, California. Naval Postgraduate School

http://hdl.handle.net/10945/7053

NAVAL POSTGRADUATE SCHOOL

MONTEREY, CALIFORNIA

EMBA PROJECT REPORT

Training Wing Five FY 2008 Primary Pilot Production

---

12 March 2008

By:
LCDR Chris Orlowski
LT Pete Chrapkiewicz
LT Matt Loverink

Senior Consultant:
Prof. Alice Crawford

Executive Summary

The annual Primary production requirement for Training Wing Five (TW-5) has increased from last fiscal year. For FY 2008, TW-5 Primary Squadrons are required to produce 735 students to progress to advanced training pipelines; an increase of 87 students from FY 2007. The increase in required production has not been accompanied by an increase in assets (instructors, aircraft, or training days). Nearing the end of the second fiscal quarter, TW-5 was approximately 800 training events behind schedule.

Given that it is behind schedule, TW-5 requires more assets to catch up and meet the current production requirement. TW-5 is not in a position to receive additional assets in the form of additional aircraft or instructors to meet the current production requirement; it can, however, increase the number of days it flies. There are 235 planned production days in a fiscal year, not including weekends and holidays. Team Variable Per Diem was tasked to analyze the number of training days it would take to meet the production requirement for FY 2008 given TW-5's current assets.

Our team began by studying Chief of Naval Air Training (CNATRA) and TW-5 production planning factors. Through interviews and historical data, our team scrutinized the planning factors and compared them against what occurs on a daily basis on the flight line. The results show that TW-5's production requirements are at or above operating capacity with respect to instructor manning and aircraft availability. Moreover, the planned 235 training days are insufficient and an equivalent of approximately 14 additional training days will be

required to meet the current year’s training requirements. We recommend that the additional training days be attained by a combination of occasionally opening NAS Whiting Field North (NSE) for weekend operations, flying out of Pensacola Regional Airport (PNS) on the weekend, and shifting the Flight Surgeon syllabus flights to Training Wing Six (TW-6), located at NAS Pensacola.

TABLE OF CONTENTS

I. INTRODUCTION AND BACKGROUND

A. INTRODUCTION

TW-5's Primary Training Squadrons currently appear to be operating at or near 100 percent capacity. For production-type operations, simulations have shown that process time will significantly increase if the production line is required to operate above 85 percent capacity[1]. This type of increase is already being noticed at TW-5 Primary Squadrons as student time to train continues to go up. Our team recognizes this as an opportunity to examine CNATRA and TW-5's assumptions for determining production capacity. In analyzing these assumptions, we intend to give an estimate of training days required to meet FY 2008's production requirements.

B. BACKGROUND

The annual production requirements for TW-5 have increased over the last two fiscal years. For FY 2008, TW-5 Primary Squadrons are required to produce approximately 735 students to fill the needs of the advanced training pipelines. This is an increase of approximately 80 students from FY 2007 and nearly 100 students from FY 2006. The increases in production requirements have not been accompanied by an increase in assets (instructors, aircraft, or training days).

To determine the annual production requirements for TW-5, CNATRA has made many assumptions with factors such as weather, aircraft availability, instructor availability production capacity. Current NIPDR[2] information states that TW-5 Primary Squadrons are at or above their entitlements for student loading, instructor manning, and aircraft. After the first fiscal quarter, TW-5 Primary

1 Capacity studies were conducted as part of NPS EMBA course GE3042: Operations Management, taught by Prof. Doerr. Simulation used was from Littlefield Technologies at http://littlefield.responsive.net/littlefield/littlefieldHome.html.

2 NIPDR is a compound acronym and means NAPP Integrated Production Data Repository; NAPP is short for Naval Aviation Production Process.

Squadrons were approximately 800 training events behind schedule. Based on the CNATRA assumptions, TW-5 is properly resourced, yet it is gradually falling further behind its production schedule; there must, therefore, be a disconnect somewhere in the planning process, or TW-5 is not actually properly resourced as believed.

The resource inputs to the planning process are not easily changed. An increase in instructor manning or available aircraft involves a high level of bureaucracy and can take years to change. The input that can be changed immediately is available training days. There are 235 planned production days in a fiscal year, not including weekends and holidays. Every weekend, each of the three Primary Squadrons at TW-5 operates out of PNS in an attempt to reduce the production deficit. Every training event flown on the weekend is an event gained on the margin. As of yet, it has been unclear how many equivalent training days these weekend operations are accounting for throughout the year. The required number of training days will be our focus in this project.

C. PROJECT OBJECTIVES

1. Determine whether NAS Whiting Field Primary Squadrons will be able to make their training mission for FY 08 within the 235 training days allotted by CNATRA.

2. If 235 training days are not sufficient, determine the number of supplemental training days required to meet the training mission.

3. If more training days are required, contrast the number and type of training events achievable from supplemental weekend operations out of PNS versus supplemental weekend operations out of NSE.

4. Provide qualitative data analysis and present findings to the Deputy Commodore, TW-5, as baseline information on the effectiveness of current training and strategies for basic reformation to meet training objectives.

D. PROJECT SCOPE

- Our study did not analyze the effects of Cockpit Procedure Trainers (CPTs) or simulators; their production capacities were not in question.

- A cost benefit analysis between operations at PNS and NSE was not done and will not be provided.

E. METHODOLOGY

The project's objective was to determine the overall ability of the TW-5 Primary Squadrons to make mission for FY 2008. A quantitative analysis was done to determine the feasibility of attaining the FY 2008 student production goals established by CNATRA based on current assets. The analysis looked particularly at the assumptions made by planners with respect to: IP availability; weather days; IP manning; aircraft availability; and number of training days allotted to complete the mission. Historical data was gathered to determine the accuracy of the above assumptions as measured against actual production.

Currently, weekend operations at PNS are used to supplement training when actual training days needed are projected to be greater than training days allotted. Our team contrasted the necessity of operating out of NSE on a limited number of Saturdays versus PNS operations. We also assumed that Saturday operations out of NSE would be conducted in the same manner as any typical weekday. The production capacity of a Primary Squadron was determined with respect to daylight, instructor manning, and aircraft resources. Flight surgeon production was also scrutinized in order to determine its overall effect on student production and squadron capacity.

The project pivoted around data collection and analysis, and our team gathered resources on student production, aircraft availability, and actual Primary Squadron production. Student production information was gathered from interviews with Mr. Monty Willis, Mr. Ed Fisher, Mr. Don Fisher, and Mr. Mike Giron in the TW-5 Plans and Statistics Office. Aircraft availability statistics were

included in the information from the TW-5 Plans and Statistics Office. Interviews with Mr. Glen White, the CNATRA Maintenance Detachment Manager, provided valuable additional information about aircraft availability and maintenance procedures. Actual Primary Squadron production was compiled from a combination of information from the Training Squadron Two (VT-2) Operations Department and the TW-5 Plans and Statistics office.

The information in the Excel spreadsheets obtained from the TW-5 Plans and Statistics Office contained calculations based on assumptions directly from CNATRA. In our analysis, these assumptions were not changed; instead we used the numbers provided to derive our spreadsheets. The information developed by our team was then used for comparison and analysis to satisfy the questions purposed in our objectives.

II. CONCLUSION AND RECOMMENDATIONS

A. CONCLUSIONS

Training Wing Five's production process is similar, in a lot of ways, to any assembly line type production process. When a production process operates near 100 percent capacity, the process begins to break down. It breaks down because when it gets behind, it has no additional production capacity during its planned production time to support short-term surges to get back on track. Primary Squadrons at TW-5 are currently in this situation.

TW-5 is currently operating above 100 percent of planned capacity for both instructors and aircraft. To produce 235 students per squadron for FY 2008 (accounting for FY 2007 overproduction) the planning factors spreadsheet requires 54 Full Time Equivalent (FTE) instructors. Each squadron is at, or slightly below this number. The number of aircraft required to meet mission is 143 for the total wing. TW-5 has 149 T-34s, which appears to be more than what is required. However, when using the aircraft to student ratio from the planning factors spreadsheet, we calculated that the production capacity is only 215 students per squadron. With either calculation, it is clear that there is little to no ability to surge on a normal production day.

Flight surgeon training is impacting TW-5's ability to meet its paramount mission of training Navy and Marine Corps pilots. Because each squadron is at or above its production capacity, each flight surgeon event happens at the expense of, not in addition to, another student event. As an aggregate, flight surgeon training in a fiscal year is equivalent to approximately three full production days worth of student training.

Production requirements cannot increase without additional assets in production capacity. Since the only additional asset that can be obtained is time, TW-5 will have to fly more than the 235 planned production days. Not including cross-country training, throughout the fiscal year, TW-5 will have to fly an

equivalent of 14 additional training days. Since TW-5 completed 30 additional students in FY 2007, those students were credited toward the FY 2008 production requirements. It is unlikely that TW-5 will produce more than the total required 735 students. Projecting to FY 2009, without any overproduction from the previous fiscal year, the forecast IPP of 728 students will require an equivalent of 17 additional training days to complete.

B. RECOMMENDATIONS

TW-5 should begin negotiating with CNATRA and TW-6 for the fixed wing flight surgeon requirement to be moved to TW-6 (see Appendix C). At the time of this report, flight surgeon training at TW-5 is near completion for FY 2008 and the negative impact has already occurred. However, production requirements for FY 2009 are nearly identical to FY 2008 so the impact on TW-5's production capacity will still be evident next year. Further compounding the problem in FY 2009 is the draw down of the T-34 and the introduction of the T-6. Every production requirement that can be shed to another training wing, during what looks to be a particularly challenging year, should be.

The bottlenecks in the production process differ depending on the time of year. In the winter, availability of daylight is the major bottleneck. If TW-5 is going to spend the additional money required bringing in contract maintenance personnel to open NASWF on the weekend, this money would be best spent during the winter months. After daylight savings time (DST) begins on 9 March, there are sufficient daylight hours, on average, for a squadron to schedule every daylight event available. To accomplish this, instrument flights should be scheduled primarily after sunset; this could, however, potentially reduce the number of instrument flights flown during the week. If a squadron needs to surge, it should do so on the weekend out of Pensacola Regional and fly the instrument events it is sacrificing for daylight events during the week. It is

recommended, therefore, that for FY 2009 planning purposes, Saturday fly days should be used early in the fiscal year to overcome the daylight bottleneck.

The bottleneck for the summer months is limited instructor manning due to the cyclical nature of PCS transfers during this time of year. Primary Squadrons lose many of their most experienced instructors in the spring and summer; at the same time, the squadrons are unable to use the replacement instructors as they go through the Fixed-Wing Instructor Training Unit (FITU). Due to this deficit, our recommendation is for the Primary Squadrons to use their Reserve Component to bolster its surge capacity. Reserve Component Commanders (RCCs), squadron Commanding Officers (COs), and Operations Officers (OPSOs), should make every attempt to motivate reservists to participate as much as funding will allow.

Barring any unusual weather events, we do not believe that full Saturday fly days at NSE are required to meet mission for FY 2008. As of 2 March 2008, TW-5 has flown 590 training events out of PNS on the weekend, or an equivalent to approximately 10 training days. If squadrons schedule effectively, and recognize the seasonal bottlenecks in their processes, any surge needed can be done out of PNS. FY 2009, however, may be different. If TW-5 cannot overproduce in FY 2008 to credit FY 2009 IPP, it will be advantageous to get ahead early in the fiscal year, and open the NSE on select Saturdays to compensate for the T-6 transition in late FY 2009.

III. APPENDICES

APPENDIX A. TW-5 PLANNING FACTORS EXCEL SPREADSHEET[3]

The TW-5 JPPT Excel spreadsheet has data from FY 2004 to the present on aircraft, student, and instructor planning factors that allows TW-5 to properly forecast mission capability and capacity. The portion colored in yellow on the Inputs side of the spreadsheet, seen in Figure 1a below, contains mostly historical data that is used to derive the Outputs. Figure 1b depicts the Outputs side of the spreadsheet, which is broken down into the following columns: aircraft; instructors; Cockpit Procedures Trainers (CPTs); and Simulators. This scope of this study did not include the CPT or Simulators production capacities.

1. Inputs side

At the top left, the Master Curriculum Guide (MCG) states that Primary Squadrons have 130.95 training days to complete a student's Primary training. Continuing down, the two left columns are of particular importance to this study. Some information is taken directly from the MCG while other information is derived from historical trends and averages. Each row signifies a planning factor that is used to derive Outputs shown in Figure 1b. Below is a description of rows that this study scrutinized or took into account in its planning factors:

a. Work Hours per Day

Set at 8.0 hours per instructor from CNATRA. The 8.0 hours is considered student-to-instructor contact time and accounts for two student flight events in a day's time; events allotted 1.0 hour for each brief, 1.0 hour for each debrief, and 2.0 hours for each flight. This does not account for actual instructor hours at the squadron for required ground duties, physical training, or paper work associated with accomplishing the student flight events.

[3] Obtained from the TW-5 Plans and Statistics Office, 2008.

b. Average Sortie Length

This is complied from dividing total student required MCG hours by total required MCG student flight events.

c. Availability

Aircraft availability is determined by dividing Average Number of RFT Aircraft Available At This Site for Past 5 Years by Average Number of PAA Assigned At This Site for Past 5 Years. Instructor availability is set by CNATRA at 80 percent; it has no historical input and is considered constant. However, over the past five years, we were unable to find a Primary Squadron that was able to achieve this rate of instructor availability (see Appendix B).

d. Working Days per Year

Working Days per Year are also determined by CNATRA. It takes into account all weekends, Federal Holidays, PRTs, SSD, etc., that do not count as a day squadrons can utilize assets to complete their production mission. This number would be increased in order to fulfill the requirement of planned production.

e. Planned Production (graduates)

This number comes from CNATRA and is determined by the Pentagon in order to maintain the proper number of warfare qualified aviators on hand for national security. It varies from year to year, while most other assets remain constant.

f. Average Number of RFT Aircraft Available At This Site for Past 5 Years

RFT stands for Ready for Training. In FY 2004 and FY 2005, the numbers are higher than for FY 2006 and FY 2007 due to a change in contract maintenance. After an interview with Mr. Glen White, CNATRA Maintenance Detachment Manager, it was discovered that the fist two years were erroneously high due to a change in how RFT aircraft is calculated. The actual number should have been closer to the FY 2006 and FY 2007 numbers. In later capacity calculations, these numbers are changed in order to reflect reality, which brings the availability rate down.

g. Average Number of PAA Assigned At This Site for Past 5 Years

Total numbers of aircraft owned by the Navy that are counted as assets, i.e., have a BUNO number.

Figure 1a

Curriculum:	Joint Primary Pilot Training (MPTS-C)					
Location:	TRAWING FIVE					
Student MCG Reference:	1542.140C					
MCG Training Days:	130.95	or 29.06 Calendar Weeks				
Travel/Awaiting Training Weeks:	2.00					
	Aircraft	**Flt Instr**	**Trnr Inst**	**Trainer or Simulator 1**	**Simulator 2**	
Type/Designation:	T-34C		Contractor	2B37	2B37	
Student Syllabus Hours	89.0	80.6	0.0	6.5	33.8	
Number of Events (X's)	49	44	0	5	26	
Simultaneously Logged Hrs	0.00					
Warm-Ups, ET's, & ReCk's	7.48%					
Avg Total Student Hours	99.52					
Lead/Chase Syllabus Hrs	0.75	0.75				
Attrition Percentage	9.88%					
Avg Syllabus X's Completed	15.72					
Total Avg Attrition Hours	28.94					
IUT Syllabus Length (Weeks)	18.31					
IP Tour Length (Months)	30.0					
IUT Syllabus Hours (Weighted)	74.60	74.60	0.0	2.6	7.2	
IUT Syllabus Events (X's)		56	0	2	4	
IUT Lead/Chase:Syllabus Hrs	0.00	0.00				
NATOPS Requal	2.0					
Instrument Requal	2.0					
Standardization Ck Flts	7.80					
Instr Proficiency/Currency	5.4				0.0	
Maintenance	0.92%					
Logistics	2.23%					
Ferry	0.09%					
Work Hours Per Day	10.0	8.0	0.0	16.0	16.0	
Average Sortie Length	1.816	1.832	0.000	1.300	1.300	
Turn Around Time	2.00			0.25	0.25	
Student Contact Time		2.70	0.80			
Availability	67.66%	80.0%	0.0%	98.0%	98.0%	
Efficiency Factor	95.00%	98.00%	100.0%	100.0%	100.0%	
Weather Factor	80.85%					
Working Days Per Year	235					
Planned Production (Graduates)	705	705	705			

	FY2003	FY2004	FY2005	FY2006	FY2007	TOTAL
Total Flight Hours Flown in Past 5 Years for this Phase			69,006.2	76,743.6	80,405.0	226,154.8
Total ASR Syllabus Flight Hours Flown in Past 5 Years for this Phase			52,331.3	60,214.0	64,384.2	176,929.5
Total Warm-Up Hours Flown in Past 5 Years for this Phase			4,093.6	2,934.3	2,645.6	9,673.5
Total Extra-Time and Recheck Hours Flown in Past 5 Years for this Phase			1,404.4	1,323.4	835.5	3,563.3
Total Maint/Functional Ck Flt Hrs Flown in Past 5 Years for this Phase			702.6	724.2	662.3	2,089.1
Total Logistics Flight Hours Flown in Past 5 Years for this Phase			1,562.0	1,668.7	1,801.5	5,032.2
Total Ferry Flight Hours for Past 5 Years Flown in Past 5 Years for this Phase			112.8	25.2	54.6	192.6
Total Number of Completors In This Phase for Past 5 Years			556.0	588.0	680.0	1,824
Total Flight Hours Flown By Completors In This Phase for Past 5 Years			57,097.7	58,251.4	66,170.5	181,519.6
Total Student X's Completed In This Phase for Past 5 Years			27,749.0	32,421.0	34,659.0	94,829
Total Number of Student Attrites In This Phase for Past 5 Years			53.0	75.0	72.0	200
Total Flight Hours Flown By Attrites In This Phase for Past 5 Years			1,623.1	2,328.4	1,835.5	5,787.0
Total Flight Events (X's) Flown By Attrites In This Phase for Past 5 Years			835.0	1,137.0	1,172.0	3,144
Average Number of RFT Aircraft Available At This Site for Past 5 Years		102.0	102.0	101.0	102.3	407.3
Average Number of PAA Assigned At This Site for Past 5 Years		149.0	151.0	151.0	151.0	602.0
Student Aircraft Sorties ~~Missed Due to Schedules Aircraft Related~~(Past 5 Years)						
Student Aircraft Sorties ~~Missed Due to Schedules Instructor Related~~ (Past 5 Years)						
Total Sorties Scheduled In This Phase for Past 5 Years		61,001	58,240	57,784	62,346	239,371
Total ASR Flyable Days In This Phase for Past **5** years		179.2	174.0	197.0	196.0	746.2
Total ASR Scheduled Days In This Phase for Past **5** years		221.0	232.0	235.0	235.0	923.0

DESCRIPTION OF CHANGES	Data	Changed by:
Updated IUT syllabus data	8/1/2006	ARO
Annual Update	1/4/2007	ARO
Annual Update	11/2/2007	ARO

Updated information added by Team Variable Per Diem

Items highlighted in blue were used by Team Variable Per Diem in their analysis

2. Outputs Side

Figure 1b shows the Outputs Side of the TW-5 Planning Factors spreadsheet. The information from Figure 1a above is used to derive the required number of assets to complete the mission. In essence, in order for TW-5 to complete 705 planned graduates within the 235 training days available in FY 2008, it needs 142 aircraft and 161 (54 per squadron) FTE instructors. The aircraft requirement is derived from dividing the total number of hours required by all assets by each asset's individual utilization rate required to meet mission. Total number of instructors is derived in a similar manner. Divide total required hours to complete mission by each instructor's individual requirement.

The two ratios provided by the spreadsheet that are of particular importance are: Aircraft:Student and Aircraft:Instructor. These ratios are important in determining the production capacity of a squadron. As aircraft availability rate changes or instructor availability rate changes, these ratios change. Aircraft and instructor availability have already been determined to be too high, causing the ratios to increase, which results in a requirement of more assets needed to accomplish the mission.

Figure 1b

COMPUTATION OF PLANNING FACTORS (PEACETIME) — *2-Nov-07*

Curriculum: ***JOINT PRIMARY PILOT TRAINING (MPTS-C)*** — Student MCG Reference: **1542.140C**

Location: ***TRAWING FIVE*** — IUT MCG Reference: **1542.61K**

Calendar Training Weeks: **29.0** Travel/Awaiting Training Weeks: **2.0** Total Training Weeks: **31.0**

	Aircraft		Flight	Instructor				CPT		Simulator	
	Type:	T-34C	Events	Aircraft		Trainer		2B37		2B37	
	Factor	Hours/ Student	X's/ Student	Factor	Hours/ Student	Factor	Hours/ Student	Factor	Hours/ Student	Factor	Hours/ Student
STUDENT HOURS						Contractor					
Student Syllabus		89.00	49.00	(44 Dual Xs)	80.60		0.00	(5 Evts)	6.50	(26 Evts)	33.80
Over Syllabus Length	4.34%	3.86		4.34%	3.50						
Warm-Ups, ET's, & ReCk's	7.48%	6.66		7.48%	6.03	0.00%	0.00	7.48%	0.49	7.48%	2.53
Total Student Hours		99.52	49.00		90.13		0.00		6.99		36.33
Less: Simultaneously Logged Hrs		0.00									
Total Adjusted Student Acft Hrs		99.52									
LEAD/CHASE OVERHEAD											
Syllabus Hrs		0.75			0.75						
Over Syllabus Length	4.34%	0.03		4.34%	0.03						
Warm-Ups, ET's, & ReCk's	7.48%	0.06		7.48%	0.06						
Total Lead/Chase Hours		0.84	0.00		0.84		0.00		0.00		0.00
ATTRITION OVERHEAD											
Attrition Percentage	9.88%										
Avg Syllabus X's Completed	15.72		1.72								
Avg Syllabus Hrs Completed	28.55	3.13		25.86	2.84	0.00	0.00	2.09	0.23	10.84	1.19
Over Syllabus Length	1.24	0.14		1.12	0.12						
Warm-Ups, ET's, & ReCk's	-0.85	-0.09		-0.77	-0.08	0.00	0.00	-0.06	-0.01	-0.32	-0.04
Total Avg Attrition Hours	28.94	3.18	1.72		2.88		0.00		0.22		1.15
INSTRUCTOR OVERHEAD											
IUT Syllabus Length (Weeks)	18.31										
IP Tour Length (Months)	30.00										
IUT Syllabus Hours	74.60	6.78		74.60	6.78	0.00	0.00	2.60	0.24	7.20	0.65
Over Syllabus Length	3.24	0.29		3.24	0.29						
Warm-Ups, ET's, & ReCk's	2.79	0.25		2.79	0.25						
Lead/Chase: Syllabus Hrs	0.00	0.00		0.00	0.00						
Over Sylllabus Length	0.00	0.00		0.00	0.00						
Warm-Ups, ET's, & ReCk's	0.00	0.00		0.00	0.00						
NATOPS Requal	2.00	0.27		*(Hrs/Studx2)*	0.54						
Instrument Requal	2.00	0.45		*(Hrs/Studx2)*	0.90						
Standardization Ck Flts	7.80	1.06		*(Hrs/Studx2)*	2.12						
Instr Proficiency/Currency	5.40	0.74			0.74					0.00	0.00
Total Instructor Overhead Hours		9.84	0.00		11.62		0.00		0.24		0.65
AIRCRAFT OVERHEAD											
Maintenance	0.92%	1.08			1.08						
Logistics	2.23%	2.61			2.61						
Ferry	0.09%	0.11			0.11						
Total Aircraft Overhead Hours		3.80	0.00		3.80		0.00		0.00		0.00
GRAND TOTALS		117.18	50.72		109.27		0.00		7.45		38.13
UTILIZATION FACTORS				**Aircraft Instructor**		**Trainer Instructor**		**CPT**		**Simulator**	
Work Hours Per Day		10.00			8.00		0.00		16.00		16.00
Average Sortie Length		1.82			1.83		0.00		1.30		1.30
Turn Around Time		2.00			N/A		N/A		0.25		0.25
Student Contact Time		N/A			2.70		0.00		N/A		N/A
Availability		67.66%			80.00%		0.00%		98.0%		98.0%
Efficiency Factor		95.00%			98.00%		0.00%		100.0%		100.0%
Weather Factor		80.85%			80.85%		N/A		N/A		N/A
Working Days Per Year		235			235		N/A		235		235
Annual Utilization Rate (Hrs)		582			481		0		3,090		3,090
RATIOS	Aircraft:Student		Hrs:X	Acft Instr:Student		Trnr Instr:Student		CPT:Student		Simulator:Student	
	0.20134		2.31	0.22717		0.00000		0.00241		0.01234	
				Combined	0.22717	Combined					
Asset Requirements		**Acft**	**X's**	**Aircraft Instructor**		**Trainer Instructor**		**CPT**		**Simulator**	
Phased Graduates	705		705		705		705		705		705
Hours/Graduate	117.18		50.72	109.27		0.00		7.45		38.13	
Hours Required		82,612			77,036		0		5,253		26,882
Number Required		142	35,758	IP's Req'd	161		0		2		9
				IUT's Req'd	24						
				Total Instr	185	0.2604459					

Items highlighted in blue were used by Team Variable Per Diem in their analysis

APPENDIX B. IP CAPACITY DATA: VT-2 IP MANNING AUG 07 AND VT-6'S INSTRUCTOR AVAILABILITY STUDY FROM FY 2000.

1. Squadron IP FTE[4]

This spread sheet determines the total number of Instructors that a squadron has available to train students throughout the year. It reflects each individual's position in the squadron with respect to what percentage can they realistically achieve 8.0 hours of student contact time per day. From CO down to reserve instructors, each is assessed a Full Time Equivalent (FTE) multiplier. This FTE multiplier determines how much an instructor's position in the squadron takes away from man power or their availability to train students. Having a 1.0 FTE means that an instructor's capacity is 100 percent, a 0.5 FTE is 50 percent, and 0.25 is 25 percent. The CO and XO are each only given a 0.25 FTE, which means that when combined, they only count as half of an instructor. Combined, they should only be able to fly half of the required 481 hours an instructor needs to fly annually. Total FTE at the bottom provides the total number of instructors available daily to train students after using the FTE multiplier per instructor; VT-2, for example, has a man power of 53 instructors to utilize.

Figure 2

Squadron: VT-2 February-08 **SQUADRON IP FTE** Aircraft: T-34

Service	CO/XO	Dept Hd (4 MAX)	STU CON FLT LD SCHEDS (3MAX)	TAD to WING or CNATRA	Assigned to FITU/HITU	IP assigned as GRND School Inst (2MAX)	SELRES	IA /Long Term Med Down	All Other IP's	Total IPs	IUT	Total Onboard	FTE
USN (P)	2	3	3	2	2	2	14	2	22	52	4	56	11.75
USMC (P)		1		1	1		3		13	19	1	20	2.25
USAF (P)										0	0	0	0.00
USCG (P)				0					2	2		2	0.00
IMT (P)										0		0	0.00
Total	2	4	3	3	3	2	17	2	37	73	5	78	
Factor	0.25	0.5	0.75	1.0	1.0	0.5	0.25	0	1.0		0		Total FTE
FTE	0.50	2.00	2.25	3.00	3.00	1.00	4.25	0.00	37.00		0.00		53.00

[4] Obtained from TW-5 Plans and Statistics Office, 2008.

Appendix C: Flight Surgeon Syllabus Analysis

A portion of TW-5's annual training requirement is to train flight surgeons. The flight surgeon fixed-wing syllabus is seven flight events in duration. There are six daytime events: four familiarization flights (FAMs), one precision aerobatics flight (PA), and one formation flight (FORM). Additionally, flight surgeons fly one night familiarization (Night FAM) flight. Flight surgeons being to arrive for training the first week of September and the last ones check out the last week of March.

According to TW-5 Plans and Stats Office's Planning Factors Excel spreadsheet, each VT squadron is required to graduate 31 flight surgeons for FY 2008. Given the number of flight surgeons and the length of the syllabus, each VT squadron will need to fly 217 additional events this year; broken down this equals 186 daytime and 31 night events. A TW-5 Primary squadron for FY 2007 averaged approximately 57 student events produced per day.[5] This equates to 3.8 training days, or nearly one full work-week of additional training.

VT-2 has essentially eliminated one flight by only scheduling the flight surgeon FORM event in the backseat of a student solo chase aircraft. Scheduling this way couples two events since the solo chase aircraft flies with only an instructor; scheduling the flight surgeon into this flight utilizes an otherwise unused crew position. If the flight surgeons have reached time-to-train (TTT) and have not completed the FORM flight, a waiver is generated for the flight and the syllabus is completed. By operating this way, VT-2 has shortened the flight surgeon syllabus to five daytime events and one night event. This brings the total events to 186 and decreases training days required to 3.2 days.

This additional training requirement occurs in the winter time, during which the bottleneck resource for a fixed wing training squadron is daylight. Moreover, these flight surgeon events are flown in addition to, not instead of, regular student training requirements. Given the add-in nature of and time of year in

---

5 Student Training Events per day derived from the TW-5 Plans and Stats VT Weekend Hours Excel spreadsheet .

which these events are required, they further constrain the daylight resource by adding more daylight events. If the fixed-wing flight surgeon syllabus were eliminated from Whiting Field and shifted to the TW-6 at Sherman Field[6], then three full days of regular student training could be accomplished without operating on the weekends.

6 Anecdotal evidence from talking with personnel who work in Sherman VT Operations offices suggest that they are not overburdened and might be able to absorb the flight surgeon load.

APPENDIX E: VT-6 STUDY[7]

In FY 2000, VT-6 took a similar approach to determining overall squadron capacity by analyzing instructor availability rates. CNATRA states that each squadron should be able to utilize each instructor to an 80 percent capacity. It is up to each squadron's CO to ensure proper utilization of resources to meet mission. VT-6 determined that average instructor availability was about 72 percent. Using the FTE multipliers, they determined the fixed cost of operating a squadron for one day was 14 total instructors. They took into account each office, the total number of personnel in that office, and their hours per work day required to do ground duties as a result of their position. Because this takes time away from an instructors required 8.0 hours of contact time with a student, the result was lower availability of instructors to train students. The total required work hours for ground duties performed by instructors was calculated to be 131.50 hours. With an 8.0 hour work day, this requires 14 instructors are left off the schedule per work day to ensure that the squadron is operating properly with respect to day-to-day administrative duties. Three additional personnel are added to the 14: the CO; XO; and the 4 Department Heads (each department head is 25 percent of an instructor, equaling one total). This now totals 17 total personnel required for ground duties. At their FY 2000 manning levels of 61 instructors, that left only 44 for scheduling each day; an instructor availability rate of 72 percent. This is 8 percent lower than the CNATRA mandated 80 percent availability rate.

Furthermore, the VT-6 study states that once average factors like service member leave (20 days), medical unavailability (6 days), instrument ground school (1 day), emergency refresher simulator flights (1 day), annual physicals (1 day), and bi-annual physical readiness tests (2 days), are accounted for, the average instructor availability rate drops even further. Their study determined an instructor availability rate of approximately 72 percent, 8 percent lower than 80 percent assumed by CNATRA.

---

[7] Obtained from VT-2 Operations Department, 2008.

Figure 3a

			Hours/ Work Day	Hours/ Work Month	Hours/ Work Year
EXECUTIVE BRANCH					
1	**Commanding Officer**		8.00	-	-
2	**Executive Officer**		8.00	-	-
	Squadron Augment Unit Comr	Reserve (N/A)	-	-	-
	Senior Watch Officer		0.25	5.00	60.00
	Command Security Manager		-	-	-
	DAPA		-	-	-
	Casualty Asst Team Ldr (Coll)		-	-	-
	Student CACO		-	-	-
	Assistant CACO		-	-	-
	Marine CACO		-	-	-
	Coast Guard CACO		-	-	-
	Legal Officer		-	-	-
	Civ Personnel Officer (Coll)		-	-	-
	Marine Corps Liaison (Coll)		-	-	-
	Coast Guard Liaison (Coll)		-	-	-
	Command Fitness Coordinator		-	-	-
	Command Security Manager		-	-	-
	Urinalysis Coord (Coll)(Primary)		0.25	5.00	60.00
ADMINISTRATIVE DEPARTMENT					
3	**Administrative Officer**		4.00	80.00	960.00
	Asst Administrative Officer		1.00	20.00	240.00
	Communications/Mail Mgr/		-	-	-
	Credit Card Manager		-	-	-
	Resources Mgmt Officer (Coll)		-	-	-
	Public Affairs Officer		-	-	-
	Asst Public Affairs Officer		-	-	-
	1st Lieutenant/Physical Security		-	-	-
	Assistant 1st Lieutenant	Civilian	-	-	-
	Disaster Preparedness Officer/		-	-	-
	Fire Marshall/Trans/Utilities	Collateral	-	-	-
	Conserv Officer (Coll)	Collateral	-	-	-
	ISSSO		-	-	-
	Supply/ADP Officer		-	-	-
STANDARDIZATION DEPARTMENT					
4	**Standardization Officer**		4.00	80.00	960.00
	Reserve Standardization Office	Reserve (N/A)	-	-	-
	Asst Standardization Officer		2.00	40.00	480.00
	Flight Standardization "1"		-	-	-
	Flight Standardization "1"		-	-	-
	Flight Standardization "2"		-	-	-
	Flight Standardization "2"		-	-	-
	Stage Leader "DCON" (Coll)		-	-	-
	Stage Leader "INAV" (Coll)		-	-	-
	Stage Leader "FORM" (Coll)		-	-	-
	Stage Leader "NCON" (Coll)		-	-	-

Figure 3b

OPERATIONS DEPARTMENT					
5	Operations Officer		8.00	-	-
	Reserve Operations Officer	Reserve (N/A)	-	-	-
	Asst Operations		2.00	40.00	480.00
	Senior RDO (Coll)/Swo (Coll)		-	-	-
	Future Operations Officer		-	-	-
	Current Operations Officer		-	-	-
	HurrEvac/Navigation Officer		-	-	-
	Flight "1" Alpha Leader		2.00	40.00	480.00
	Assistant Flight "1" Alpha Lea	Collateral	-	-	-
	Scheds Officer "1"	Duty	-	-	-
	Scheds Officer "1"	Duty	-	-	-
	Scheds Officer "1"	Duty	-	-	-
	Scheds Officer "1"	Duty	-	-	-
	Flight "2" Alpha Leader		2.00	40.00	480.00
	Assistant Flight "2" Alpha Lea	Collateral		-	-
	Scheds Officer "2"	Duty		-	-
	Scheds Officer "2"	Duty		-	-
	Scheds Officer "2"	Duty	-	-	-
	Scheds Officer "2"	Duty	-	-	-
	Flight One Bravo Leader		-	-	-
	Assistant Flight "1" Bravo Lea	Collateral	-	-	-
	Flight Two Bravo Leader		-	-	-
	Assistant Flight "2" Bravo Lea	Collateral	-	-	-
STUDENT CONTROL DEPARTMENT					
	Student Control Officer		2.00	40.00	480.00
	Reserve Student Control Office	Reserve (N/A)	-	-	-
	Asst Student Control Officer		-	-	-
	Jacket Officer		-	-	-
	Jacket Officer		-	-	-
	Jacket Officer		-	-	-
	IMSO		-	-	-
				-	
SAFETY DEPARTMENT				-	
6	Safety Officer		4.00	80.00	960.00
	Reserve Safety Officer	Reserve (N/A)	-	-	-
	Aviation Safety Officer		1.00	20.00	240.00
	General Safety Officer		-	-	-
	NATOPS Officer		1.00	20.00	240.00
	Maintenance Safety Officer	Collateral	-	-	-
	Total Work Hours Required by 1301 (Not to include six Admin positions)		49.50	510.00	11,880.00
Duties/TAD					
	Skeds Officers (2 per day)		10.00	200.00	2,400.00
	Flight O's (schedule scrubbers)		5.00	100.00	1,200.00
	RDO'S (2 OLF's/day...2 duties per day)		20.00	400.00	4,800.00
	FDO's (3 duties per day)		18.00	360.00	4,320.00
	Academic TAD		5.00	100.00	1,200.00
	FITU TAD (3 bodies, full time)		24.00	480.00	5,760.00
	Total Work Hours - REQUIRED DUTIES		82.00	1,640.00	19,680.00
	Total Work Hours - Performed by IP's		131.50	2,150.00	31,560.00
FIXED COST: Total IPs Required for Ground Jobs and Duties (8 hour workday)				**14**	
			Admin Positions (CO, XO, Admino, OpsO, StanO, Safety)	3	
			TOTAL OFFICERS NEEDED FOR SQUADRON GROUND JOBS/DUTIES:	**17**	
			Current Manning at VT-6	**61**	
			IPs available for flight schedule	**44**	**72%**

APPENDIX F: CAPACITY

The Capacity spreadsheet shows the capacity of a Primary Squadron to produce students given a set number of instructors or aircraft. In this case, VT-2 was used as the example. On the left side, only instructor capacity is calculated; in the middle, only aircraft capacity is calculated; and on the right, ready for training aircraft capacity is calculated. The main focus of each calculation is to relate how the ratio of student-to-instructor or student-to-aircraft determines the maximum capacity of VT-2. This is then weighed against the required production for FY 2008. The calculation is done by multiplying the ratio of students to either instructor or aircraft by the total number of FTE instructors or mission capable aircraft. The result is considered the capacity of the squadron.

There are two areas of concern when performing these calculations. One is aircraft that are mission capable. Though there area total of 149 T-34 aircraft in TW-5's inventory, of which, only 129 are capable of performing a mission that advances a student through the syllabus on any given day.[8] Of those 129 aircraft, a certain percentage will also require maintenance. Therefore, the actual number of aircraft that maintenance has ready for training each day is a different number than those that are mission capable. This study assumes a best case scenario in order to show that even assuming a perfect environment, the aircraft are over-tasked. Actual numbers of ready for training aircraft are lower than 129; historically, it is 102 with recent daily RFT numbers as low as 75.

The other area of concern is the required number of students that CNATRA requires for FY 2008. By subtracting the calculated capacity from the CNATRA requirement provides the difference in production numbers. The difference is shown in red to indicate a negative, or shortage of production. Dividing the CNATRA requirement by the actual capacity that was calculated was done to show operations over 100 percent are needed to obtain CNATRA requirements. Actual CNATRA required production from the TW-5 JPPT

8 Information taken from the CNATRA DET Daily Aircraft Status report, which was obtained from Mr. Glen White.

spreadsheet is 245. Due to overproduction in FY 2007, 30 students were credited to FY 2008 production, 10 for each Primary Squadron. This brings the CNATRA requirement down to 235 students per Primary Squadron.

Instructor capacity begins with re-introducing the assumptions made for the calculation. Two primary inputs are used: FTE and the student-to-instructor ratio. The full time equivalent of VT-2 is taken from the IP FTE spreadsheet. This is the maximum number of instructors that a squadron can use throughout the year. This accounts for all Selective Reservists and as well as all active duty service members.

The second input is the ratio of students to instructors. This is taken directly from the TW-5 JPPT spreadsheet. The ratio from the spreadsheet was converted from an instructor-to-student ratio to a student-to-instructor ratio by dividing it by one. This allows for easier calculations when determining capacity. The total production requirement for FY 2008 is 235 students. The capacity for VT-2, given 53 instructors and a ratio of 4.40 students for every instructor, is 233 students. This is 2 students less than the 235 required by CNATRA. Moreover, according to this calculation, VT-2 is currently operating at 101 percent capacity to keep up with production requirements. .

Further down the spreadsheet flight surgeons are introduced as another variable. Each squadron is required to produce 31 Flight Surgeons annually. According to TW-5 planning factors, this requires an FTE of one IP per squadron to produce their quota of flight surgeons annually. This further decreases the number of instructors available to fly normal flight student events, effectively changing the FTE from 53 to 52. The flight surgeon requirement also decreases the number of aircraft available by one as well. Essentially, these reductions in total instructors and aircraft will decrease the capacity to produce students. Running the same calculation above with only 52 instructors produces a capacity of 229 students. This result shows a deficit of 6 students, which would require operating at 103 percent capacity to attain the CNATRA production requirements.

Lastly, for comparison purposes, the instructor availability factor is changed from 80 percent to 72 percent, the number provided from the VT-6 study. This new factor was input directly into the TW-5 JPPT spreadsheet, which resulted in the ratio of students to instructor changing from 4.40 to 3.91. Carrying out the computation as before, a new capacity of 207 students was attained. This is 28 students below the CNATRA production number and would require a production rate 13 percent higher than maximum capacity.

On the aircraft side of the spreadsheet, the same calculations are performed, only with different numbers. Changing the number of mission capable aircraft to 129, and multiplying it with the student to aircraft ratio of 5.23, produces a production capacity of 225 students. This result is 10 students short of the CNATRA requirement for FY 2008. In order to achieve the CNATRA production number, each squadron will have to operate 4 percent over capacity.

Revisiting flight surgeons, recall that they requires one Aircraft per squadron to produce their quota annually. This decreases the number of aircraft available by one. It therefore changes the mission capable aircraft number from 129 to 128. Running this calculation produces a capacity of 223 students; 12 students short of the CNATRA production requirement. In order to recover these 12 students, Primary Squadrons will have to operate at 105 percent capacity.

Finally, aircraft ready for training numbers were used for aircraft availability. This led to an aircraft capacity of 187 students, 48 short of the CNATRA production requirement. In order to recover those 48 students, TW-5 Primary Squadrons would have to operate at 26 percent over capacity. Introducing flight surgeons leads to a capacity of only 185 students and a deficit of 50 students for the year. In order to recover those 50 students, Primary Squadrons would have to operate at 27 percent over capacity.

Figure 4

VT-2 Capacity Calculations

Spreadsheet Notes:

This spreadsheet is designed to show VT-2's production capacity in two ways. The first is in instructor manning. The second is in aircraft availability. All inputs to the capacity calculations have come from the TW-5 planning factors spreadsheet. Any changes to the data from the TW-5 planning factors spreadsheet have been annotated with explainations.

Instructor Factors	
Total IP's Available (AD and SELRES)	78
IP FTE	53.00
IP Availability	80%
IP Hours	481
Work Days	235
Work Hours/day	8.00
Efficiency Factor	98.00%
WX Factor	80.50%
Average Sortie Length	1.83
Student:IP	4.40

Aircraft Factors: Mission Capable Aircraft	
Total Aircraft	149
Mission Capable Aircraft	129
Aircraft Availability	71%
Aircraft Hours	613
Work Days	235
Work Hours/day	10.00
Efficiency Factor	95.00%
WX Factor	80.85%
Average Sortie Length	1.82
Student: Aircraft	5.23

Aircraft Factors: Ready for Training Aircraft	
Total Aircraft	149
Ready for Training Aircraft	107
Aircraft Availability	71%
Aircraft Hours	613
Work Days	235
Work Hours/day	10.00
Efficiency Factor	95.00%
WX Factor	80.85%
Average Sortie Length	1.82
Student: Aircraft	5.23

Calculation Notes: Instructor Capacity Calculation is found by multiplying the Student to IP ratio by IP FTE.
The result shows how many students can be produced by a squadron based on IP manning.

Calculation Notes: Aircraft Capacity Calculation is found by multiplying the Student to Aircraft ratio by Mission Capable Aircraft.
The result shows how many students can be produced by a squadron based on available aircraft.
Inputs for this result represent data for all of TW-5. The calculation was divided by 3 to represent one squadron's capacity.

Instructor Capacity Calculation	233	**Aircraft Capacity Calculation**	225	**Aircraft Capacity Calculation**	187
Planned Production Per Squadron	235	Planned Production Per Squadron	235	Planned Production Per Squadron	235
Planned vs Capacity Delta	-2	Planned vs Capacity Delta	-10	Planned vs Capacity Delta	-48
Operating Capacity	101%	Operating Capacity	104%	Operating Capacity	126%

Calculation Notes: Each squadron is required to produce 31 Flight Surgeons annually. According to TW-5 planning factors, this requires one IP and one Aircraft per squadron to produce their quota annually.

Capacity Including Flight Surgeons

IP FTE	52.00	Mission Capable Aircraft	128	Ready For Training Aircraft	106
Instructor Capacity Calculation	229	**Aircraft Capacity Calculation**	223	**Aircraft Capacity Calculation**	185
Planned vs Capacity Delta	-6	Planned vs Capacity Delta	-12	Planned vs Capacity Delta	-50
Operating Capacity	103%	Operating Capacity	105%	Operating Capacity	127%

Calculation Notes: Instructor avalability from TW-5 planning factors is 80%. Citing a VT-6 study on IP availability, the CNATRA availability rate is too liberal. The VT-6 study concluded that IP availabiliy was no higher than 72%. Using an IP availabilty rate of 72%, the below calculations show the impact of fewer available instructors. Instructor availability rate will not impact aircraft capacity.

Student:IP	3.91
IP FTE	53.00
Instructor Capacity Calculation	207
Planned Production Per Squadron	235
Planned vs Capacity Delta	-28
Operating Capacity	113%

APPENDIX G: SCHEDULING CAPACITY

Approximately 66 percent of the flights in the Primary Training Syllabus are required to be flown during daylight hours. The remaining events can be flown at night, with four of those events being dedicated night events. The number of training events that can be scheduled is directly related to the number of daylight hours each day. The methodology for this section was to break the year into two training seasons, winter and summer, to determine where the scheduling bottleneck was. For calculation purposes, winter was considered to begin at the end of Daylight Savings Time on 1 November and end on 9 March when it resumes.

The analysis began by finding and graphing the sunset for each day of calendar year 2008 for the Pensacola area.[9] For each season, an average sunset was calculated. It was determined during the analysis that sunrise was not a factor because NSE opens at 0645 with the first scheduled takeoff at 0700. During the entire year, sunrise is either at or before the first scheduled takeoff time and does not impact the flight schedule.

The schedule for the Primary Squadrons is limited to a maximum of two events every fifteen minutes or eight events every hour due to constraints of the maintenance contract. The average daylight sortie length is 1.9 hours. During the winter season, the last scheduled takeoff time a daylight event is 1515 in order for that event to return before sunset. Using these assumptions, 66 daylight events can be scheduled per squadron, per day on average during the winter. The question these constraints frame is whether 66 daylight events per day are enough.

To address this question, VT-2 has a firm scheduling policy that any event that can be flown at night will be scheduled at night, freeing up valuable daytime schedule slots for events that need daylight. Only under rare circumstances are events able to be flown at night scheduled during the daylight hours. The team

9 Information obtained from www.timeanddate.com.

took a random sample of flight schedules from VT-2 between 1 November 2007 and 20 January 2008 and analyzed the number of students not scheduled (on stand-by) for daylight events. The resulting number of students represented those that should have been scheduled but were not due to daylight limitations. Any events that could have been scheduled at night but were not were taken into account.

Based on these inputs, it was calculated that an average of 7 students were not scheduled per day, which means that during the winter months, approximately 73 daylight events need to be scheduled when only 66 can be scheduled. The same analysis for the summer season was conducted, when the average sunset in the summer is 1917. This translates to 82 possible daylight events that can be scheduled, which is beyond the calculated requirement of 73 and shows that the number of hours of daylight in the summer is not a bottleneck.

These results are important in determining the best timeframe if NSE is to be opened on one or more Saturdays. During the winter months, the limited number of daylight hours is the bottleneck in the production process. With few exceptions, the daylight events need to be flown out of NSE because the final flight of those blocks of training is a student solo event; all solos are required to be flown from NSE. Because of the need for familiarity and repetition, flying those events out of PNS on the weekend rarely makes sense from a training perspective. Therefore, if additional money is allocated to open NSE on the weekend, it is logical to do it during the winter months. From a cost effectiveness point of view, during the summer months, a squadron should maximize its daylight events during the normal workweek. If additional training days are needed, instrument and night events should be flown out of PNS.

Figure 5

Scheduling Requirements

Assumptions:

Winter hours are considered from the end of daylight savings time on 1 November to 9 March when it resumes. Summer hours are the rest of the year. For the model, the average sunset for the time of year will be used when calculating the number of daylight events that can be scheduled for the given time of year. Sunrise is not a factor because, for the entire year, it occures either at or before the first scheduled takeoff of 0700.

Winter Flight Schedule	
Flight Duration in Hours	1.9
First Takeoff	0700
Number of Events in an Hour	8
Calculated Sunset	1710
Average Time of Last Takeoff	1515
Hours of Daylight to Schedule	8.25
Daylight Events to be Launched	66
Daylight Events Required	73

Calculation Notes: Winter Daylight Events to be Launched is found by multiplying the Number of Events in an Hour by Hours of Daylight to Schedule. Result is rounded to nearest whole number.

Daylight Events Required is found by adding Daylight Event to be Launched and the Average of the Unscheduled Daylight Required Events figured below.

Summer Flight Schedule	
Flight Duration in Hours	1.9
First Takeoff	0700
Number of Events in an Hour	8
Calculated Sunset	1917
Average Time of Last Takeoff	1715
Hours of Daylight to Schedule	10
Daylight Events to be Launched	82

Calculation Notes: Summer Daylight Events to be Launched is found by multiplying the Number of Events in an Hour by Hours of Daylight to Schedule. Result is rounded to nearest whole number.

Daylight Events Requried not calculated because there is enough daylight during the Summer to schedule all available daylight events.

Sampling of Unscheduled Daylight Required Events			
01 Nov 07	7	07 Dec 07	9
02 Nov 07	2	10 Dec 07	6
06 Nov 07	3	11 Dec 07	2
09 Nov 07	7	18 Dec 07	5
12 Nov 07	4	14 Jan 08	4
15 Nov 07	12	15 Jan 08	8
16 Nov 07	7	16 Jan 08	16
19 Nov 07	9	17 Jan 08	6
20 Nov 07	4	18 Jan 08	8
03 Dec 07	14	22 Jan 08	18
06 Dec 07	1	30 Jan 08	10
	Average	7	

Data Entry
Results
Totals

Assumptions:

On each day the number of student stand-by events for contact and formation flights was tabulated. Events that could have been scheduled at night but were scheduled during daylight hours were subtracted from this number.

APPENDIX H: TRAINING DAYS NEEDED TO MEET MISSION

The number of training days beyond the planned 235 is the final question the team needed to answer. Several different approaches were considered when trying to make the calculation. The team decided to look at FY 2007 as the benchmark when trying to determine what the production capabilities for FY 2008 and FY 2009 are going to be.

FY 2007 was statistically an exceptional year for TW-5. All three Primary Squadrons met their training requirements, and two out of the three were able to get ahead and begin flying events planned for FY 2008. A comparison was made to how many training events are being flown during the week this year compared to the same time last year. Adjusting for weather, the number of weekday events is about the same. The effective weather for FY 2007 was 85.30 percent, which is better than the historic average of 80.85 percent.[10] The assumption was made that given the current assets, which have not changed from FY 2007, TW-5 is flying as many events as is possible during the normal workweek. Because a squadron is limited by the maintenance contract in the number of events that can be scheduled per hour, and the weather last year was atypically good, it is not reasonable to expect that a squadron will be able to make up any additional production requirements during the week. Any production requirement increase from the previous year will need to be done on the weekend or other non-designated training days.

The production requirement increase from FY 2007 to FY 2008, accounting for attrition, warm-up flights, and extra training flights, is 1589 training events per squadron. In FY 2007, each squadron in TW-5 flew an average of 10,650 training events during the week. Using the constraints mentioned above, it was assumed that the same number would be flown during the week in FY 2008. Furthermore, in FY 2007, TW-5 flew 10 percent of all events on the

[10] Information taken from the TW-5 Weekly Statistical Report, which was obtained from the TW-5 Plans and Statistics Office.

weekend, of which, 46 percent of those events (545 per squadron) were flown out of PNS; the remaining 54 percent were flown as normal cross country events. Because TW-5 flew an average of 57.46 training events per day per squadron during the week in FY 2007, the 545 events per squadron flown out of PNS during the year equates to 9.9 full training days gained beyond the planned 235.

The same analysis was completed for FY 2008 accounting for the 30 students over-produced in FY 2007 and credited to FY 2008. If 33,331 training events are expected to be flown during the week, 5297 events will remain to be flown on the weekend. The same ratio of cross country-to-PNS operations used for FY 2007 was used for FY 2008; the result was 2437 training events that would have to be flown out of PNS throughout the year. To meet mission, TW-5 will have to fly an equivalent of 14 additional full training days.

The final calculation was a projection for FY 2009. The assumption was made that TW-5 would make mission in FY 2008, but would not complete any students beyond the required amount. Therefore, TW-5 would be required to produce all of the projected 728 students in FY 2009. Using the same assumptions and calculations, FY 2009 will require an equivalent of 17 additional full training days.

Figure 6

Training Days to Meet Mission

Data Entry	
Results	
Totals	

Yearly Training Requirement	FY07	FY08	FY09
Total Wing Five Production Requirement	646.00	735.00	728.00
Students Completed Beyond FY Requirement	30.00		
Adjusted Requirement From FY07 Carry Over		-30.00	
Total IPP	676.00	705.00	728.00
FY07/08 Delta		29.00	
FY07/09 Delta			52.00

Calculation Notes: Yearly Training Requirements were referenced from TW-5 IPP spreadsheet.

Student Syllabus Length	FY07	FY08	FY09
Syllabus X's per Student	49.00	49.00	49.00
ET/WU/Attrition Multiplier	11.82%	11.82%	11.82%
Student X's Including ET/WU/ Attrition multiplier	54.79	54.79	54.79

Calculation Notes: Student X's including ET/WU/Attrition multiplier calculated by multiplying Syllabus X's per student by the ET/WU/Attrition multiplier; the result was then added to the Syllabus X's per student.
Syllabus X's per student referenced from the MPTS syllabus guide.

Additional X's Required in FY08	FY07	FY08	FY09
Additional X's Required		1421.00	2548.00
Student X's including ET/WU/ Attrition multiplier		1588.96	2849.17

Calculation Notes: Additional X's required calculated by multiplying the FY07/08 Delta by Syllabus X's per student. Student X's including ET/WU/Attrition multiplier calculated by multiplying the Additional X's required result by the

	FY07	FY08	FY09
Total X's for FY	37,039.00	38,628.00	39,888.00

Calculation Notes: Total X's for FY calculated by multiplying Total IPP result by the Student X's including ET/WU/Attrition multiplier .

Weekend Operations	FY07
Percentage of Yearly X's Flown on Weekends	10.01%
Weekend X's Flown in FY	3708.00
Weekday X's Flown in FY	33331.00

Calculation Notes: Weekend X's Flown calculated by multiplying the Total X's for FY result by the Percentage of Yearly X's Flown on Weekends.
Total Yearly X's Flown on Weekends referenced from TW-5's VT Weekend Hours spreadsheet.

Percentage of Weekend X's Flown at PNS	46.00%
Weekend X's Flown at PNS in FY07	1706.00

Calculation Notes: Weekend X's Flown at PNS in FY calculated by multiplying the Weekend X's Flown in FY result by Percentage of Weekend X's Flown at PNS.
Percentage of Weekend X's Flown at PNS referenced from TW-5's VT Weekend Hours spreadsheet.

Weekend Operations Equivalency	FY07
Average Syllabus X's Flown per Weekday in FY07	172.38
Equivalent PNS Training Days	9.90

Calculation Notes: Equivalent PNS training Days calculated by dividing the Weekend X's Flown at PNS in FY07 result by Syllabus X's Flown per Weekday in FY07.
Syllabus X's Flown per Weekday in FY07 referenced from TW-5's VT Weekend Hours spreadsheet.

Calculation Notes and Assumptions: Each squadron is restricted by contract to a fixed schedule of no more than eight events per hour. The effective weather for FY07 was 85.3% which was better than the historical rate of 80.85%. With those considerations, it is not reasonable to expect that a squadron will be able to make up any additional production requirements during the week. Any requirement increase from the previous year will need to be done on the weekend or other non designated training days.

FY 08 Requirements	FY08	FY09
Expected Weekday X's to be Flown in FY08	33,331.00	33,331.00
Remaining X's to be flown on Weekends	5297.00	6557.00
Percentage of Weekend X's Flown at PNS	46.00%	46.00%
Weekend X's expected to be flown at PNS	2437	3016
Equivalent PNS Training Days	14	17

Calculation Notes: Since the number of students to be trained has increased, the ratio of Cross Country to PNS events flown on the weekend is assumed to be constant.

Conclusion: For TW-5 to meet mission in FY08, it will need to fly an equivalent of 14 additional training days worth of student events. The projection for FY09 is and equivalent of 17 additional training days worth of student events.

LIST OF REFERENCES

Thorson, S., (2008). *Sunrise and Sunset in Pensacola – Florida.* Retrieved February 18, 2008, from, http://www.timeanddate.com/worldclock/astronomy.html?n=944.

INITIAL DISTRIBUTION LIST

1. Prof. Alice Crawford
   Naval Postgraduate School
   Monterey, California

2. COL John Walsh, Deputy Commodore
   Training Wing Five
   Milton, FL